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10 CFR § 50.73
L-2010-272

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555-0001

Re: Turkey Point Unit 3
Docket No. 50-250
Reportable Event: 2010-003-00
Date of Event: September 23, 2010
Reactor Trip Due to Fault on 230kV
Side of Generator Step-Up Transformer

The attached Licensee Event Report 05000250/2010-003-00 is being submitted pursuant to 10 CFR 50.73(a)(2)(iv)(A) due to a valid actuation of the Reactor Protection System resulting in a reactor trip.

If there are any questions, please call Mr. Robert Tomonto at 305-246-7327.

Very truly yours,

Michael Kiley
Vice President
Turkey Point Nuclear Plant

Attachment

cc: Regional Administrator, USNRC, Region II
Senior Resident Inspector, USNRC, Turkey Point Nuclear Plant

IE22
NRR

NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resourse@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

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4. TITLE
Reactor Trip Due to Fault on 230kV Side of Generator Step-Up Transformer

6. LER NUMBER					7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME / DOCKET NUMBER
09	23	2010	2010	- 003 -	00	11	19	2010	FACILITY NAME / DOCKET NUMBER

9. OPERATING MODE
1

10. POWER LEVEL
100%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☒ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Ronald Everett	305-246-6190

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	EL	XFMR	VA TEC ELIN	YES					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On September 23, 2010, with Unit 3 operating at 100% power, an unplanned automatic reactor trip occurred at approximately 17:14:40 when an electrical flashover on the high side of the Unit 3 Generator Step Up (GSU) transformer occurred. All systems responded as designed

At 17:52, a notification (EN# 46274) was made to the NRC Operations Center in accordance with 10 CFR 50.72(b)(2)(iv)(B) due to actuation of the Reactor Protection System with the reactor critical and 10 CFR 50.72(b)(3)(iv)(A) due to Auxiliary Feedwater System actuation. The Unit 3 reactor and turbine tripped due to a generator differential protection relay trip. This event was entered into the Corrective Action Program as AR 582206. All systems functioned as normal with the exception of Control Rod G5 in Control Bank A which indicated 18 steps. The unit entered and exited E-0 "Reactor Trip" and ES-0.1 "Reactor Trip Response." All 4kV buses had power from the Unit 3 Start Up Transformer. Heavy weather (rain and wind) conditions existed at the time of the reactor trip. The root cause was an external flashover to ground of the "C" phase high voltage (HV) bushing. The Unit 3 GSU Transformer High Voltage Bushings (all phases) were replaced with longer bushings. Transformer Surge Arresters, Stand Off Insulators, Conductors, and Generator Radial Lead Seals were replaced.

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NARRATIVE

DESCRIPTION OF THE EVENT

On September 23, 2010, with Unit 3 operating at 100% power, an unplanned automatic reactor trip occurred at approximately 17:14:40 when an electrical flashover on the high side of the Unit 3 Generator Step Up Transformer [EL, XFMR] occurred. All systems responded as designed

At 17:52, a notification (EN# 46274) was made to the NRC Operations Center in accordance with 10 CFR 50.72(b)(2)(iv)(B) due to actuation of the Reactor Protection System with the reactor critical and 10 CFR 50.72(b)(3)(iv)(A) due to Auxiliary Feedwater System actuation. Unit 3 reactor [AB,RCT] and turbine [TA,TRB] tripped due to a generator differential protection relay trip. This event was entered into the Corrective Action Program as AR 582206. All systems functioned as normal with the exception of Control Rod G5 in Control Bank A which indicated 18 steps. The unit entered and exited E-0 "Reactor Trip" and ES-0.1 "Reactor Trip Response." All 4kV buses had power from the Unit 3 Start Up Transformer. Heavy weather (rain and wind) conditions existed at the time of the reactor trip.

CAUSE OF THE EVENT

The event was evaluated to determine the root cause and contributing causal factors. The root cause was an external flashover to ground of the "C" phase high voltage (HV) bushing. The root cause did not originate with the GSU transformer or connected 230kV transmission system. The one cause that could not be refuted was the potential for rapid contamination of the GSU transformer bushing due to steam/canal water carryover effluent from the circulating water system condenser water box priming system. If this was the cause, the priming system deficiencies that could have contributed to the rapid contamination event include a clogged moisture separator drain line loop seal, failed condenser water box check valves, and a corroded silencer of the circulating water condenser water box primary system ejector that no longer performed moisture separation and did not prevent saline laden steam and water droplets from exiting the system. Nonetheless, evidence supporting this potential cause was not found.

ANALYSIS OF THE EVENT

At the time of the event, it was raining. However, no lightning was recorded at the plant at the time of the event based on the National Lightning Detection Network and eyewitness accounts. Wind speed was approximately 9 miles per hour with wind gusts. Interviews revealed that a heavy rain continued after the event. Consequently, any contamination evidence was likely removed.

REPORTABILITY

The event is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) due to automatic actuation of the Reactor Protection System when an unplanned reactor trip occurred and 10 CFR 50.73(a)(2)(iv)(B) due to automatic actuation of the Auxiliary Feedwater System.

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ANALYSIS OF SAFETY SIGNIFICANCE

The plant responded as expected to the automatic reactor trip. Although one control rod indication remained at 18 steps, the control rod was subsequently verified to be fully inserted and the rod position indicator was appropriately adjusted.

CORRECTIVE ACTIONS

Immediate Corrective Actions:

- Replace GSU Transformer Surge Arresters (all phases)
- Replace 230kV Stand Off Insulators (all phases)
- Replace High Voltage (HV) Bushings (all phases) with longer bushings
- Replace conductors between 230kV string bus and GSU HV bushings (jumpers)
- Internal inspection of the GSU transformer
- Generator Radial Lead Seals were replaced

Corrective Actions to Prevent Recurrence:

1. Implement long term action plan for the Unit 3 and 4 Circulating Water System to mitigate degradation issues that lead to canal water carry over. Action plan to improve the following:
   - Silencer condition and performance
   - Moisture separator (3/4T34) drain line operation
   - Water box vacuum tank check valves operation
   - Vacuum air leaks.

2. Replaced Unit 3 GSU Transformer High Voltage Bushings (all phases) with longer bushings. (Complete)

3. Replace Unit 4 GSU Transformer High Voltage Bushings (all phases) with longer bushings.

Contributing Cause Corrective Actions:

1. Unclogged moisture separator drain loop seal. (Complete)

2. Replaced the silencer of the Circulating Water Condenser Water Box Priming System Ejector. (Complete)

3. Replaced all four condenser water box vacuum tank check valves (Complete)

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NARRATIVE

ADDITIONAL INFORMATION

EIIS Codes are shown in the format [IEEE system identifier, component function identifier, second component function identifier (if appropriate)].

FAILED COMPONENTS IDENTIFIED: Unit 3 Step-Up transformer

PREVIOUS SIMILAR EVENTS: None